S5 Data Quality Investigation Status

John Zweizig
LIGO/Caltech

LSC/Virgo DetChar Session
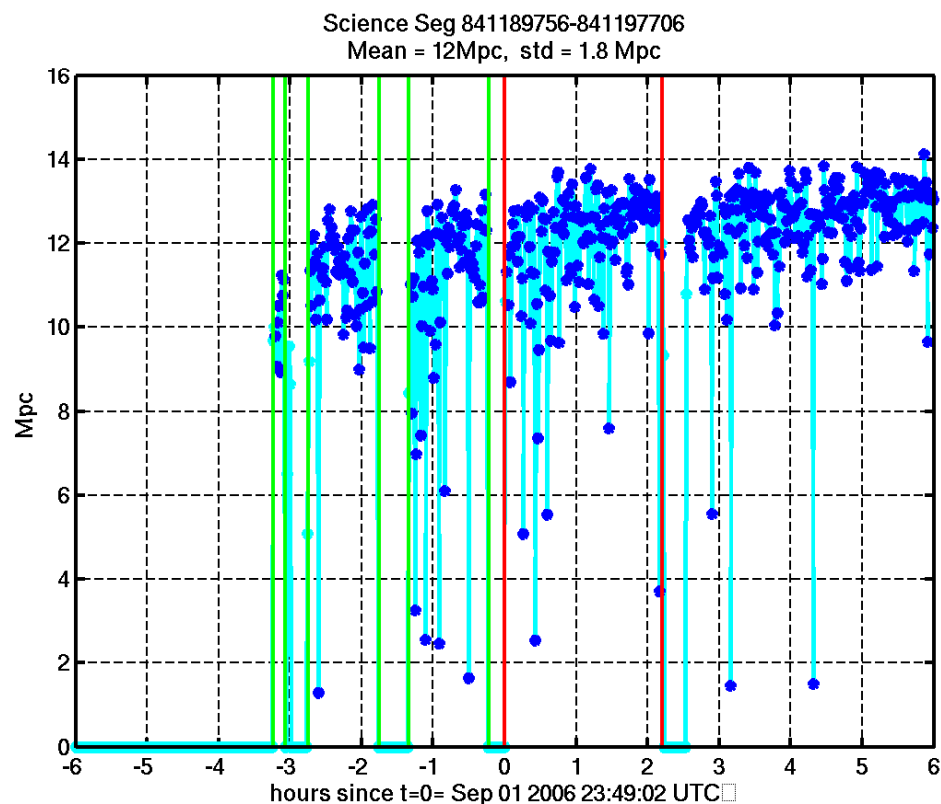## MIT, July 25, 2007

Brief Review

- Segments continue to be generated both on-line and off-line

- Analysis groups should remember that flags should be chosen carefully after considering the requirements of the specific analysis.

- Keith Riles maintains the definitive list of segment descriptions at:

  http://gallatin2.physics.lsa.umich.edu/~keithr/S5DQ/flaginfo.html

Gaby's L1 Glitchy Segments

- Gaby scanned L1 SenseMon trends for science mode segments with large range variations (♦ > 1 is highest 12%).

- She then looked at the eLog for indication of the source of the glitchiness.

- DQ segments generated from these:

  - BADRANGE_GLITCHINESS

  - EARTHQUAKE_GLITCHINES

  - ELEVATED_GLITCHINESS

 - HURRICANE_GLITCHINESS

  - SEVERE_GLITCHINESS

  - SPOB_GLITCHINESS

Science Seg 841189756-841197706
Mean = 12Mpc, std = 1.8 Mpc

http://www.phys.lsu.edu/faculty/gonzalez/S5/L1BadSegs

Justin's Low-f DARM_ERR Veto

- Justin looked at DARM_ERR bands near SUS resonances and in 57Hz band.

- Look for up-conversion in 70-110Hz band in segments with Low-f RMS > 3 thresholds.

- Generate segments:

  - DARM_09_11_dHz_LOWTHRESH
    DARM_09_11_dHz_MEDTHRESH
    DARM_09_11_dHz_HIGHTHRESH
    DARM_11_13_dHz_LOWTHRESH
    DARM_11_13_dHz_MEDTHRESH
    DARM_11_13_dHz_HIGHTHRESH
    DARM_18_24_dHz_LOWTHRESH
    DARM_18_24_dHz_MEDTHRESH
    DARM_18_24_dHz_HIGHTHRESH
    DARM_50_70_dHz_LOWTHRESH
    DARM_50_70_dHz_MEDTHRESH
    DARM_50_70_dHz_HIGHTHRESH

LIGO-G07(...)
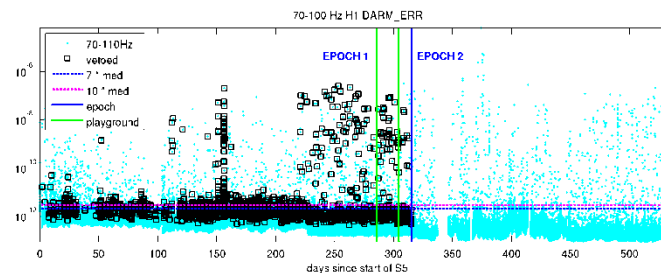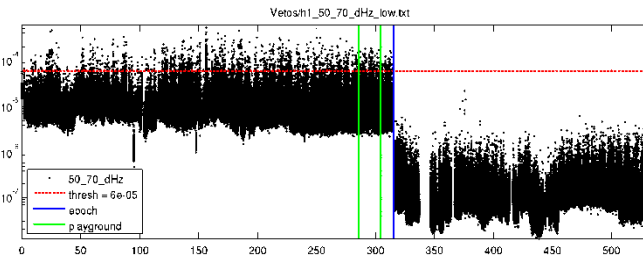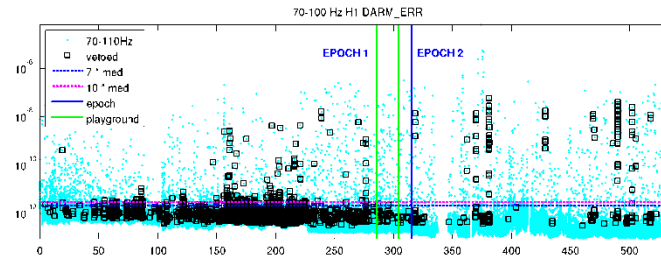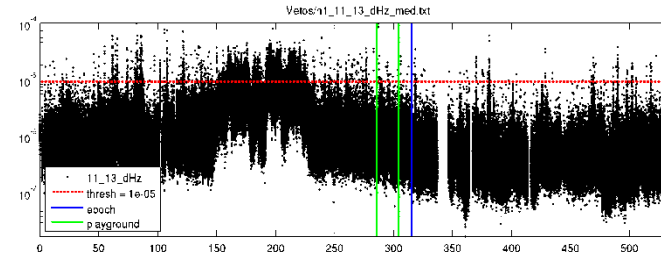
ETM Side Coils

- Side coil dirvers go into seismically initiated osciallations at ~6 Hz

  - Mechanical resonances ~1Hz

  - Unknown driving mechanism

    - Servo instability?

- Diagnosis

  - Laura creates ETMY_SIDE flags based on Vmon channel (16Hz)

  - Overflow channels don't work

  - Coil readback at LHO only and doesn't cover full range (readback ±2V, DAC ±5V)

  - Extrapolate from coils assuming sinusoid.

H1:LSC-DARM_ERR at 864600641.856
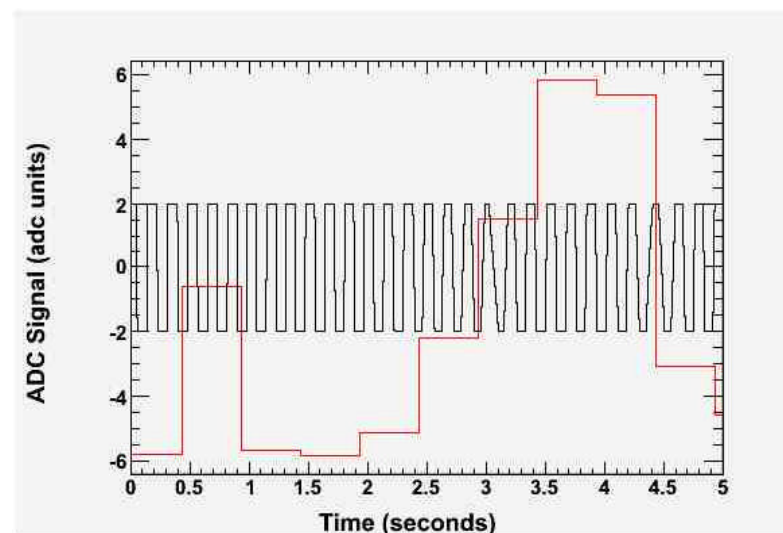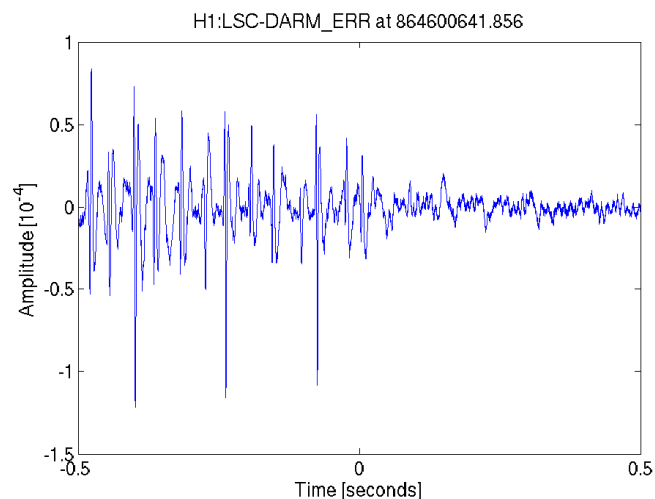
Recent additions

- New missing V3 calibration h(t) for H1, H2, and L1 version 3 offline calibration through April 23, 2007: MISSING_RDS_C03_L1 MISSING_RDS_C03_L2 (flags are version 1)(Xavi Siemens)

- New missing h(t) flags for H1, H2, and L1 version 3 online calibration following April 23, 2007: MISSING_RDS_C03_L1 MISSING_RDS_C03_L2 (flag is version 1) (Greg Mendell)

- New "glitchiness" flags for L1 through the first year of S5, based on examining short epochs with degraded inspiral range. The different pathologies are: BADRANGE_GLITCHINESS, EARTHQUAKE_GLITCHINESS, ELEVATED_GLITCHINESS, HURRICANE_GLITCHINESS, SEVERE_GLITCHINESS, SPOB_GLITCHINESS (version 1 flags) (Gaby Gonzalez)

- New L1 BAD_CALIBRATION_NEAR_7KHZ flag (version 1) for period in February 2006 when notch filters in end-mass suspensions were not correct. (Gaby Gonzalez)

- New H1 & H2 CONLOG_SICK flags for a 2-week period in November 2006 when conlogger was disabled and not taking H1/H2 out of science mode when control setting changed. (Keith Riles)

Recent additions

- H1 & H2 NO_CALIB_LINE flags through July 12, 2007. (Myungkee)

- Fixed MISSING_RDS_C02_LX (now version 4)(Xavi Siemens)

- New H1 & H2 DEWAR_GLITCH flags for Dec 12, 2006 to Feb 23, 2007 (Emelie Harstad)

- STOCHASTIC_INJECTION flags from S5 start to Apr 18, 2007 (Vuk Mandic)

- Updated CALIB_BAD_COEFFS_60 flags for 50-hour period centered on GRB070201 (Myungkee Sung)

- Low-frequency DARM_ERR flags for H1 with the names:DARM_09_11_dHz_LOWTHRESH DARM_09_11_dHz_MEDTHRESH DARM_09_11_dHz_HIGHTHRESH DARM_11_13_dHz_LOWTHRESH DARM_11_13_dHz_MEDTHRESH DARM_11_13_dHz_HIGHTHRESH DARM_18_24_dHz_LOWTHRESH DARM_18_24_dHz_MEDTHRESH DARM_18_24_dHz_HIGHTHRESH DARM_50_70_dHz_LOWTHRESH DARM_50_70_dHz_MEDTHRESH DARM_50_70_dHz_HIGHTHRESH to cover up to Apr 30, 2007 (Justin Garofoli)

- Updated SEVERE_LSC_OVERFLOW flags for all IFO's for the period 844500000-844600000

Recent additions

- Updated POWMAG flags for all IFOs through Mar 15, 2007 (Laura Cadonati)

- Updated SIDECOIL_EMTX, SIDECOIL_ETMY flags for H1 through Feb 19, 2007 (Laura Cadonati)

- Updated lockloss and pre-lockloss flags with the names: OUT_OF_LOCK PRE_LOCKLOSS_10SEC PRE_LOCKLOSS_30SEC PRE_LOCKLOSS_60_SEC PRE_LOCKLOSS_120_SEC to cover up to Apr 24, 2007 (Peter Shawhan)

- Updated light dip flags with the names: LIGHTDIP_02_PERCENT LIGHTDIP_03_PERCENT LIGHTDIP_04_PERCENT LIGHTDIP_05_PERCENT LIGHTDIP_06_PERCENT LIGHTDIP_07_PERCENT LIGHTDIP_08_PERCENT LIGHTDIP_10_PERCENT LIGHTDIP_12_PERCENT LIGHTDIP_15_PERCENT LIGHTDIP_20_PERCENT to cover up to Apr 24, 2007 (Peter Shawhan)

- Updated master overflow flags: MASTER_OVERFLOW_ASC MASTER_OVERFLOW_LSC MASTER_OVERFLOW_SUS_MC2 MASTER_OVERFLOW_SUS_RM to cover up to Apr 24, 2007 (Peter Shawhan)

- Updated missing-dataset flags: MISSING_RAW MISSING_RDS_LEVEL_1 MISSING_RDS_LEVEL_3 MISSING_RDS_LEVEL_4 to cover up to May 30, 2007 (Greg Mendell)

On the horizon

- H1 AS_TRIGGER flags are missing from GPS 821000000 - present.
    - Need rescan of GPS 821M-822M (in progress)
    - Will release/insert updated flags soon through GPS 855M.
- Better definition of end of Science mode?
- Better coil saturation monitoring.